

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

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PCT NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of Mailing
(day/month/year)

02 JUL 2004

Applicant's or agent's file reference

IMPORTANT NOTIFICATION

100 325.0208PCT

International application No.

International filing date (day/month/year)

Priority date (day/month/year)

PCT/US03/25372

13 August 2003 (13.08.2003)

05 June 2003 (05.06.2003)

Applicant

FLUOR CORPORATION

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US

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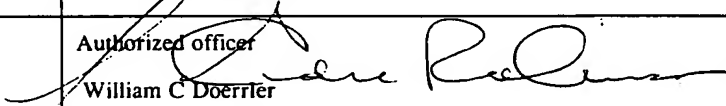
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

| | | |
|---|---|--|
| Applicant's or agent's file reference 325.0208PCT | FOR FURTHER ACTION See Notification of Transmittal of International - Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/US03/25372 | International filing date (day/month/year) 13 August 2003 (13.08.2003) | Priority date (day/month/year) 05 June 2003 (05.06.2003) |
| International Patent Classification (IPC) or national classification and IPC IPC(7): F25J 3/00; F17C 9/02; F02C 7/143 and US Cl.: 62/620; 50.2; 60/39.02, 643 | | |
| Applicant FLUOR CORPORATION | | |
| <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>2</u> sheets.</p> | | |
| <p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application | | |
| Date of submission of the demand 05 February 2004 (05.02.2004) | Date of completion of this report 15 June 2004 (15.06.2004) | |
| Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230 | Authorized officer  William C Doerrler Telephone No. (703) 308-0861 | |

I. Basis of the report

1. With regard to the elements of the international application:*

☐ the international application as originally filed.☒ the description:

pages 1-14 _____ as originally filed

pages NONE _____, filed with the demandpages NONE _____, filed with the letter of _____.☒ the claims:pages NONE _____, as originally filedpages NONE _____, as amended (together with any statement) under Article 19pages NONE _____, filed with the demandpages 15-17 _____, filed with the letter of 06 May 2004 (06.05.2004) _____.☒ the drawings:

pages 1-2 _____, as originally filed

pages NONE _____, filed with the demandpages NONE _____, filed with the letter of _____.☐ the sequence listing part of the description:pages NONE _____, as originally filedpages NONE _____, filed with the demandpages NONE _____, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).☐ the language of publication of the international application (under Rule 48.3(b)).☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.☐ filed together with the international application in computer readable form.☐ furnished subsequently to this Authority in written form.☐ furnished subsequently to this Authority in computer readable form.☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.4. ☒ The amendments have resulted in the cancellation of:☒ the description, pages None☒ the claims, Nos. None☒ the drawings, sheets/fig None5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/25372**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. STATEMENT**

| | | |
|-------------------------------|--------------------|-----|
| Novelty (N) | Claims <u>1-20</u> | YES |
| | Claims <u>NONE</u> | NO |
| Inventive Step (IS) | Claims <u>1-20</u> | YES |
| | Claims <u>NONE</u> | NO |
| Industrial Applicability (IA) | Claims <u>1-20</u> | YES |
| | Claims <u>NONE</u> | NO |

2. CITATIONS AND EXPLANATIONS

Claims 1-20 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest a plant which uses liquefied natural gas as a cooling medium which is then expanded as a working fluid to produce electricity. The prior art shows liquefied natural gas which is used for cooling and then used as fuel in an expander. This is seen as differing from being expanded as a working fluid as claimed.

Claims 1-20 meet the criteria set out in PCT Article 33(4), and thus possess industrial applicability because the subject matter claimed can be made or used in industry.

CLAIMS

What is claimed is:

1. A plant comprising a heat source that is cooled by a refrigeration content of a first portion of a liquefied natural gas and thereby heats the first portion of the liquefied natural gas, and an expander in which the first portion of the heated liquefied natural gas is expanded as a working fluid to produce electric power.
2. The plant of claim 1 wherein the heat source comprises a combined cycle power plant.
3. The plant of claim 1 wherein at least a portion of the expanded liquefied gas is fed into a demethanizer to produce a lean gas and a demethanized bottom product.
4. The plant of claim 3 wherein the lean gas is compressed using at least part of the work provided by the expander.
5. The plant of claim 3 wherein the demethanized bottom product is fed to a deethanizer that produces an ethane product and a liquefied petroleum gas product.
6. The plant of claim 5 wherein the ethane product is employed as a fuel in the combined cycle power plant or petrochemical plant feedstock.
7. The plant of claim 5 wherein reflux condenser duty of the deethanizer is provided by the refrigeration content of the first portion of the liquefied natural gas before the heat source heats the liquefied natural gas.
8. The plant of claim 1 wherein a second portion of the liquefied natural gas is separated in a demethanizer into a lean gas and a demethanized bottom product.
9. The plant of claim 8 wherein the second portion and the first portion have a ratio of between about 0.4 to 0.7.
10. A plant comprising a liquid natural gas feed that is split in a first portion and a second portion, wherein a refrigeration content of the first portion cools a heat source in the plant to generate a heated first portion, wherein the heated first portion is expanded as

a working fluid to produce electric power before entering a demethanizer, and wherein the second portion is used as reflux for the demethanizer.

11. The plant of claim 10 in which the first portion is expanded in an expander to produce work.
12. The plant of claim 11 wherein the demethanizer produces a lean gas that is compressed to a pipeline pressure using the work provided by the expander.
13. The plant of claim 10 further comprising a deethanizer, and wherein the first portion provides reflux condenser duty for the deethanizer before the first portion is heated and expanded.
14. The plant of claim 13 wherein the demethanizer produces a bottom product that is fed to the deethanizer, and wherein the deethanizer produces a liquefied petroleum gas product and an ethane product.
15. The plant of claim 14 wherein the ethane product is combusted as a turbine fuel in a combined cycle power plant.
16. The plant of claim 10 wherein heating of the first portion is provided by a heat transfer fluid that receives heat from at least one of a gas turbine inlet air stream, a heat recovery unit, and a flue gas stream.
17. A plant comprising a regasification unit operationally coupled to a combined cycle power unit, wherein a refrigeration content in liquefied natural gas cools a heat source in the combined cycle power unit to thereby produce a heated liquefied natural gas, wherein a processed liquefied natural gas produced from the heated liquefied natural gas is compressed using power produced by expansion of the heated liquefied natural gas, and wherein the heated liquefied natural gas is expanded as a working fluid to produce electric power.
18. The plant of claim 17 wherein the regasification unit provides a combustion fuel to the combined cycle power unit, wherein the combustion fuel is prepared from the liquefied natural gas.

19. The plant of claim 17 wherein a demethanizer produces the processed liquefied natural gas.
20. The plant of claim 19 wherein the demethanizer provides a demethanized bottom product to a deethanizer, and wherein the deethanizer provides an ethane product as the combustion fuel.